Math 9 5.5 Multiplying a Polynomial by a Constant Lesson 7

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3. **a)** The display shows 5 rows of four 1-tiles. So, (4)(5) = 20

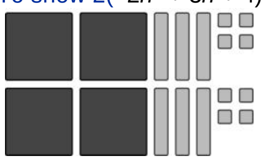
b) The display shows 3 x-tiles. So, $(3)(x) = 3x$

c) The display shows 2 rows of one x-tile and two 1-tiles. So, $2(x + 2) = 2x + 4$

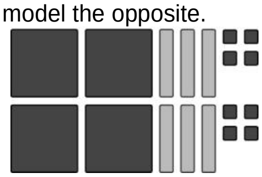
d) The display shows 3 rows of three x-tiles and two 1-tiles. So, $3(3x + 2) = 9x + 6$

5. **a)** The display shows 2 rows of two n^2-tiles, three n-tiles, and four 1-tiles. This shows $2(2n^2 – 3n + 4)$, which is the product in part ii.

b) To show $2(–2n^2 + 3n + 4)$, display 2 rows of two $–n^2$-tiles, three n-tiles, and four 1-tiles.



To show $–2(2n^2 – 3n + 4)$, display 2 rows of two n^2-tiles, three $–n$-tiles, and four 1-tiles. Then, flip all the tiles to model the opposite.



7. **a)** **i)** $3(5r) = 15r$ **ii)** $–3(5r) = –15r$

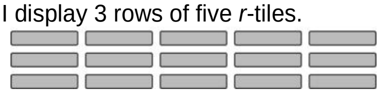
iii) $(5r)(3) = 15r$ **iv)** $–5(3r) = –15r$

v) $–5(–3r) = 15r$ **vi)** $(–3r)(5) = –15r$

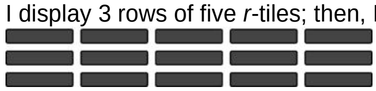
b) The products are either $15r$ or $–15r$. The product is positive when the terms being multiplied are the same sign and negative when the terms being multiplied are opposite signs.

c) I can use algebra tiles for all products in part a.

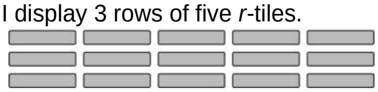
i) I display 3 rows of five r-tiles.



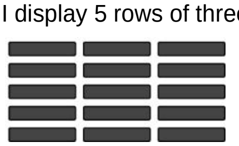
ii) I display 3 rows of five r-tiles; then, I flip the tiles to model the opposite.



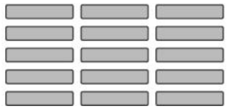
iii) I display 3 rows of five r-tiles.



iv) I display 5 rows of three r-tiles; then, I flip the tiles to model the opposite.

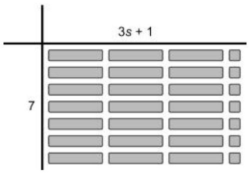


v) I display 5 rows of three –*r*-tiles; then, I flip the tiles to model the opposite.



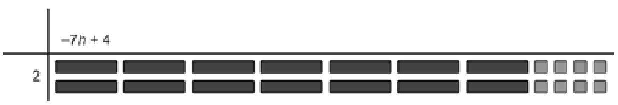
vi) I display 5 rows of three –*r*-tiles.

11. a) Display 7 rows of three *s*-tiles and one 1-tile.

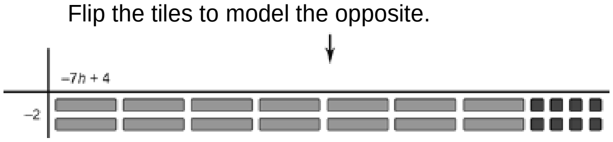


There are twenty-one *s*-tiles and seven 1-tiles.
So, $7(3s + 1) = 21s + 7$

b) Display 2 rows of seven –*h* tiles and four 1-tiles.

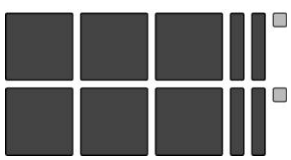


Flip the tiles to model the opposite.



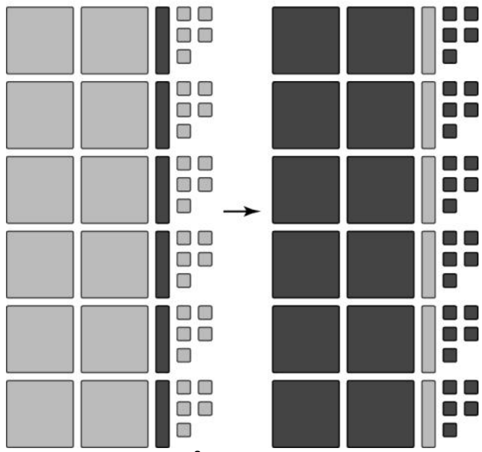
There are fourteen *h*-tiles and eight –1-tiles.
So, $-2(-7h + 4) = 14h - 8$

c) Display 2 rows of three $-p^2$-tiles, two –*p*-tiles, and one 1-tile.



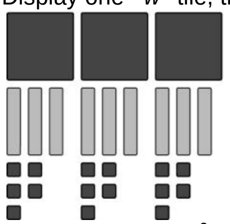
There are six $-p^2$-tiles, four –*p*-tiles, and two 1-tiles.
So, $2(-3p^2 - 2p + 1) = -6p^2 - 4p + 2$

d) Display 6 rows of two v^2-tiles, one –*v*-tile, and five 1-tiles. Then, flip the tiles to model the opposite.



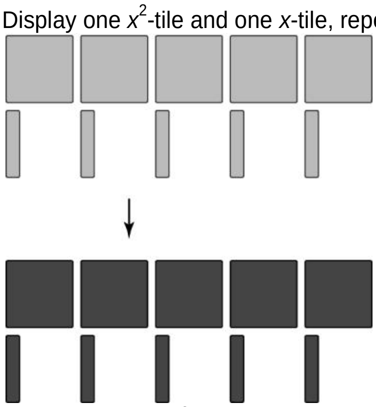
There are twelve $-v^2$-tiles, six v-tiles, and thirty –1-tiles.
So, $-6(2v^2 - v + 5) = -12v^2 + 6v - 30$

e) Display one $-w^2$-tile, three w-tiles, and five –1-tiles, repeated 3 times.



There are three $-w^2$-tiles, nine w-tiles, and fifteen –1-tiles.
So, $(-w^2 + 3w - 5)(3) = -3w^2 + 9w - 15$

f) Display one x^2-tile and one x-tile, repeated 5 times. Then, flip the tiles to model the opposite.



There are five $-x^2$-tiles and five $-x$-tiles.
So, $(x^2 + x)(-5) = -5x^2 - 5x$

12. The student did not multiply correctly. The errors are: $(-2)(-r) = 2r$, not $(-2r)$, and $(-2)(7)$ is –14, not –16.
Correct solution:
$$\begin{aligned} -2(4r^2 - r + 7) &= -2(4r^2) - 2(-r) - 2(7) \\ &= -8r^2 + 2r - 14 \end{aligned}$$

15. I used the distributive property to determine each product.

a) $$\begin{aligned} 3(-4u^2 + 16u + 8) &= -3(-4u^2) + (-3)(16u) + (-3)(8) \\ &= 12u^2 - 48u - 24 \end{aligned}$$

b) $12(2m^2 - 3m) = 12(2m^2) + 12(-3m)$

$= 24m^2 - 36m$

c) $(5t^2 + 2t)(-4) = 5t^2(-4) + 2t(-4)$
$= -20t^2 - 8t$

d) $(-6s^2 - 5s - 7)(-5) = (-6s^2)(-5) + (-5s)(-5) + (-7)(-5)$
$= 30s^2 + 25s + 35$

e) $4(-7y^2 + 3y - 9) = 4(-7y^2) + 4(3y) + 4(-9)$
$= -28y^2 + 12y - 36$

f) $10(8n^2 - n - 6) = 10(8n^2) + 10(-n) + 10(-6)$
$= 80n^2 - 10n - 60$

22. a) $2(2x^2 - 3xy + 7y^2) = 2(2x^2) + 2(-3xy) + 2(7y^2)$
$= 4x^2 - 6xy + 14y^2$

b) $-4(pq + 3p^2 + 3q^2) = -4(pq) + (-4)(3p^2) + (-4)(3q^2)$
$= -4pq - 12p^2 - 12q^2$

c) $(-2gh + 6h^2 - 3g^2 - 9g)(3) = (-2gh)(3) + 6h^2(3) + (-3g^2)(3) + (-9g)(3)$
$= -6gh + 18h^2 - 9g^2 - 27g$

d) $5(-r^2 + 8rs - 3s^2 - 5s + 4r) = 5(-r^2) + 5(8rs) + 5(-3s^2) + 5(-5s) + 5(4r)$
$= -5r^2 + 40rs - 15s^2 - 25s + 20r$

e) $-2(4t^2 - 3v^2 + 19tv - 6v - t) = -2(4t^2) + (-2)(-3v^2) + (-2)(19tv) + (-2)(-6v) + (-2)(-t)$
$= -8t^2 + 6v^2 - 38tv + 12v + 2t$